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ABSTRACT

Summarized in terms of competence and performance models is the development of questionning behavior in the language repertoire of retarded children. The role of questions, particularly WH questions, is reviewed in adult language (semantics and pragmatics) and children's language (receptive and expressive abilities). Discussed is research dealing with the effects of questions on learning and early language development (including parent-infant interaction analyses). Studies of children's interrogative production in English and other languages are considered along with research on children's comprehension of interrogatives. Results of studies with retarded children are explained to indicate similar though delayed development when compared to normal acquisition. Suggested are implications for language intervention, including the use of appropriate types and levels of questions to promote recall or language stimulation. (CL)

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THE COMPREHENSION AND PRODUCTION OF INTERROGATIVES IN THE LANGUAGE OF NORMAL AND RETARDED CHILDREN: A REVIEW AND ANALYSIS

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RESEARCH, DEVELOPMENT AND DEMONSTRATION CENTER IN EDUCATION OF HANDICAPPED CHILDREN

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The University of Minnesota Research, Development and Demonstration Center in Education of Handicapped Children has been established to concentrate on intervention strategies and materials which develop and improve language and communication skills in young handicapped children.

The long term objective of the Center is to improve the language and communication abilities of handicapped children by means of identification of linguistically and potentially linguistically handicapped children, development and evaluation of intervention strategies with young handicapped children and dissemination of findings and products of benefit to young handicapped children.

The Comprehension and Production of Interrogatives in the Language of Normal and Retarded Children: A Review and Analysis

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Endeavors to systematically enhance the communication skills development of retarded children must attend to many aspects of receptive and expressive language (Carroll, 1967; Miller and Yoder, 1973; Schiefelbusch, 1967). As Hymes (1961) has pointed out, a child must master several sets of rules: phonological, grammatical, semantic, and paralinguistic (expressive and persuasive speech behaviors). He must learn to judge appropriate distribution of possible utterances among roles and behavior settings.

To use the competence-performance terminology (Chomsky, 1957; Flavell and Wohlwill, 1969), a solid basis for language intervention with the retarded would be composed of competence or formal-logical models of the structures (phonological, syntactical, semantic) of language, and performance or automation (Flavell and Wohlwill, 1969) models which represent psychological processes by which the abstract rules are accessed and used in real life (for example, memory factors, role perception, aim of utterance).

Furthermore, two forms of competence-performance models seem needed for language intervention programs. The terminal goals of language intervention would be characterized by models of adult competence and performance in communication (Spradlin, 1967). Such

structural models seem necessary for defining "normalization" (Nirje, 1969) in language patterns of the retarded. When the probable adult environment of the mentally retarded individual differs from the normal, i.e., a sheltered workshop, its particular language demands should be analyzed (Schlanger, 1967; Spradlin, 1967).

The second form of models would include step-by-step descriptions of the development of competence and performance in language areas. Such process descriptions would give the educator means of ordering progress, locating the point of a child's development and then providing appropriate language experiences (Rest, 1974, has suggested this approach for value education; Miller and Yoder, 1973, for language intervention).

At this time, very few parts of the suggested models exist. The phonological system of adult English has been described (Chomsky and Halle, 1968; Francis, 1968; Halle, 1964). Generative grammar has provided something of a competence model for adult syntax, but transformational grammarians have disagreed about particular aspects of the model. There has been no framework analogous to generative grammar to unify work in adult semantics. Discussion of language functions has been mostly speculative or extrapolative from other areas of psychological research (Skinner, 1957). However, in recent years study of various situational influences on adult interpersonal communication has commenced (Rosenberg and Cohen, 1967).

Generally, the strengths and weaknesses of current knowledge about adult models have been reflected in paradigms of developmental competence and performance. A theory of phonological development

exists (Jakobson, 1968; Jakobson and Halle, 1956), but methodologically it has been difficult to test. The best described area of child language has been grammatical production. Grammars (in the transformational grammar cast) have been written to approximate the syntactical rules used by children from their early two-word utterances through sentences nearing adult performance (Brown, 1973; Brown and Bellugi, 1964; Brown, Cazden and Bellugi, 1969; Miller and Ervin, 1964). Recently, more attention has been paid to the semantic relational concepts expressed in early utterances (Bloom, 1970; Bowerman, 1973a; Schlesinger, 1971). However, extensions of this approach to later stage utterances, and research on other aspects of the child's semantics have not been as numerous (but see Clark, 1971; 1973; Donaldson and Wales, 1970). Performance factors such as egocentrism (Piaget, 1951), socio-economic status (Robinson, 1972; Robinson and Rackstraw, 1972), goal of utterance (Halliday, 1969, 1973; Horner and Gussow, 1972) have been studied and discussed, but rarely in a way to reliably indicate developmental trends.

It should be noted that even within fairly well-described areas of language, some topics have received more attention than others. Typically, production data have been easier to obtain than that for comprehension. The syntax and semantics of declarative, and to a lesser degree, negative sentences have been focused on as has the ideational or referential function of language.

Thus, neither the terminus nor the guideposts for language intervention has been detailed. Obviously, attempts to improve

communication skills of retarded children must continue while the competence-performance models are still being constructed. Hopefully, this paper can serve as an interim report on the progress of such an attempted construction for one language behavior. The primary purpose of this paper, then, is to summarize what is known of the competence and performance models (adult and developmental) of the language behavior of questioning, particularly as regards the comparability of such development in normal and mentally retarded children.

This paper does not purport to be a completely comprehensive review of the interrogative mode. It is hoped, though, that it will suggest some characteristics of a model's endpoints, namely, the earliest production and comprehension of questions, particularly WH questions, by the child versus usage by the mature speaker. Finally, the degree of experimental concordance of normal and retarded interrogative mode development could reflect on 1) the validity of using normal developmental data in designing language intervention programs, and 2) the timing of, and manner in which intervention might be implemented.

What is a Question?

Most generally, a question is a form of instrumental language, an utterance by which one attempts to secure action from others. The responsive action sought fills a gap in knowledge or confirms a supposition (Lewis, 1963). The question is a spontaneous search for information (Piaget, 1951). It is, then, a behavioral activity related to the acquisition of knowledge. The existence of the possibility of interrogation apparently rests on two conditions: a gap

in a framework or belief, and the availability of alternatives for filling the gap (Robinson and Rackstraw, 1972). It would appear that interrogation is universal to languages (however, Katz and Postal, 1964, have mentioned that the Siouan language apparently has no interrogative sentences).

Besides the semantic content of requesting information, a question has a formal structure which normally restricts the formal structure possible in the response (Miller and Ervin, 1964). A popular, broad differentiation of questions has utilized this response-restriction aspect of the interrogative. Some questions offer 1) possibilities of confirmation or denial; or 2) two options from which to choose. No new lexical items are required to reply to a question of this first type. Such questions have been referred to as Yes-No, binary (Siegel, 1963b), closed (Robinson and Rackstraw, 1972), sentence (Weinreich, 1963), or nexus-questions (Jespersen, 1940). Other questions request information to fill a particular gap which is specified by the interrogative word used. Such questions have been designated Wh, multiple (Siegel, 1963b), open (Robinson and Rackstraw, 1972), completion (Weinreich, 1963), or x-questions (Jespersen, 1940).

It has been hypothesized that Yes-No and Wh questions differentially locate the "heavier" cognitive burden in the speaker-respondent interaction (Cazden, 1970). That is, formulating "Did you go to work today?" requires more complicated processing than answering it. However, responding to "Why did you go to work today?" is more cognitively complex. Furthermore, Robinson and Rackstraw (1972) have

suggested that the probability of obtaining quick, useful closure of an information gap is greater when the question can be formulated as an open (Wh) question.

Since the span of this review must somehow be constrained, its inspection has been restricted to Wh questions, which seem pertinent to issues involved in the enhancement of cognition, and which are central to ongoing research activities (Buium & Turnure, 1974; Hesse, Turnure & Buium, 1975; Turnure, Buium & Thurlow, 1975).

Wh Questions in Adult Language

Traditionally, linguists have recognized three dimensions of language signs. Syntax refers to the formal relations of the signs to one another. Semantics designates the relations of signs to that to which the signs are applicable. Lastly, pragmatics deals with the study of conditions under which language signs are used (Morris, 1938). The tri partite categorization has been used here to facilitate inspection of a subject which is difficult to organize.

Syntax of Wh questions. There has been no complete exposition of the English transformational grammar of interrogation. Partial accounts, however, have been provided by Chomsky (1957, 1962), Lees (1960), and Katz and Postal (1964). These descriptions are not in total agreement. The differences revolve around the content of the underlying phrase-marker or deep structure on which transformational rules operate to produce the surface structure (the only form one actually hears or sees).

Before the syntax of Wh questions can be described, pertinent

aspects of the general transformational grammar model of language must be briefly considered. The structural representations of sentences are accounted for through the functioning of interrelated syntactic, semantic, and phonological components. Only the syntactic component is detailed here. The syntactic component specifies an underlying structure and a surface structure for a sentence.

The underlying structure of a sentence is specified by phrase structure or rewrite rules. These rules specify the underlying elements (Noun Phrase, Verb Phrase) of a sentence and grammatical relations between elements (subject of a sentence, direct object). The phrase structure rules are successively applied, rewriting one symbol at a time, to generate the derivation of a sentence. A schematic representation of the derivation is a branching tree-diagram denoted as the sentence's phrase-marker. The bottom line, or terminal string of the phrase-marker consists of lexical items and grammatical formatives ("a," "the," auxiliary of a verb phrase). Figure 1 presents the underlying phrase-marker for the sentence "What did John eat?".

The terminal string of a phrase-marker is converted to a surface structure, i.e., the recognizable "What did John eat?" through the operation of transformational rules. Transformations map underlying or deep structures into surface structures through processes of deletion, permutation, and addition of elements (see below for the transformations applied to the phrase-marker of Figure 1 to produce "What did John eat?").

The present description of Wh questions is taken largely from Katz (1968). The underlying phrase-marker for an interrogative

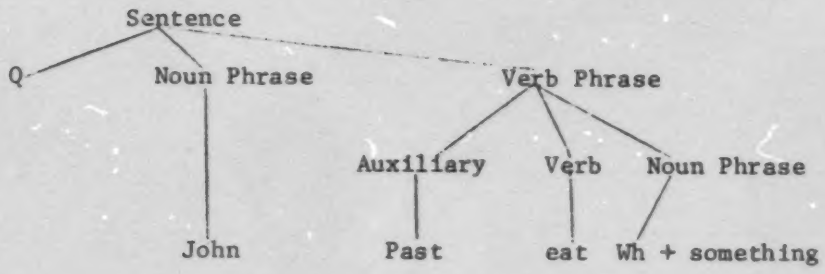

Figure 1

Typical Phrase-marker Analysis Represented as a Tree Diagram

sentence (see Figure 1) is like that of a declarative, except that its first (left) terminal symbol is Q and that it contains one or more Noun Phrases to which the symbol Wh is attached.

Q is the question morpheme which makes the question transformation obligatory (see below). Semantically, Q indicates that the sentence is a question: Q represents the meaning "I request that you answer..." (Katz and Postal, 1964; MacCawley, 1968).

Wh is the scope indicator for Q. Attachment of Wh to a Noun Phrase indicates that that Noun Phrase is questioned. In the underlying phrase-marker, the Noun Phrases to which Wh can be attached are Pro-forms: something, someone, someplace, sometime, someway. Syntactically, the Wh + Pro-form is later transformed into an interrogative pronoun (what, who, etc.) which may receive a high intonation in oral language.

Figure 1 displays a sample underlying phrase-marker for the sentence "What did John eat?". Briefly, the transformations necessary to convert this deep structure to the surface structure are:

1) Q is deleted and WH + Pro-form is moved to its place (question transformation)

2) Constituent dominated by Aux is inserted between Wh + Pro-form and subject Noun Phrase

3) "Do" is inserted immediately before Aux constituent

4) "Do" + Past is converted to "did"

5) Wh + something is converted to "what" (Katx and Postal, 1964).

One other type of grammatical description should be briefly

mentioned. Fillmore's case grammar (1968) has been examined in recent descriptions of language development (Bowerman, 1973a; Brown, 1973). The appeal of case grammar resides in the similarities of the semantic attributes of the child's two-word utterances and the case notions which are presumed to comprise a set of universal concepts which identify human judgments about events--statements about who did it, whom it happened to (Fillmore, 1968).

However, as case grammar has been treated to date it is not useful for elucidating the adult or child's interrogatives. In case grammar, the basic structure of a sentence has two constituents: proposition and modality. The proposition is a tenseless set of relationships between verbs and nouns. Modality includes negation, tense, mood, and aspect which operate on the sentence as a whole (Fillmore, 1968). However, as Bowerman (1973a) has remarked, Wh questions do not apply to whole sentences, but only to certain constituents within them, such as the agent or locative. Since the entire modality constituent is ignored in the available exposition of case grammar (Fillmore, 1968), the Wh question problem is unresolved.

Semantics of Wh questions. Direct treatment of interrogation is even more lacking in semantics than in syntax. Question features and interrogative words have usually been discussed as exemplars of, or contradictions to, some larger generalization. The context for many of these generalizations has been the use of language to make true statements. Thus it is not surprising that questions, which are not assertions, have been relegated to asides or agenda for future studies.

The approach of the review here is to 1) describe a few representatives of the treatments of question features; 2) present various descriptions of the meaning of the Wh words; and 3) note some of the semantic relationships between question and answer.

Elements of interrogation such as the written question mark and the oral question intonation are members of a class of features whose status as signs has been disputed in semantics. The difficulty is in assigning meaning to such signs, or in explaning to what they refer. Linguists have disposed of the problem differently. The approaches of Morris (1946) and Weinreich (1963) are noted here.

Morris (1946) has classified ! ? () as formators. Formators are signs which lead their interpreters to modify in determinate ways the dispositions to response occasioned by the other signs in the sign combinations in which the formator appears. Specifically, interrogative features are a type of formator denoted as modors--intonations and speech melodies (in oral language) which differentiate statement, appraisal, and prescription. Interrogative modors mark an utterance as prescriptive, that is, as calling for the required performance of a specific response.

Weinreich (1963) has differentiated several subcategories within Morris' category of formators (1946). Interrogative formators are members of the subcategory "pragmatic operators." Pragmatic operators are discourse features which comprise assertion, and features incompatible with assertion--question, command. A question is marked pragmatic mode incompatible with assertion.

The interrogative pragmatic operator may be applied to the sentence as a whole (sentence or Yes-No questions), or to parts of the sentence (completion or Wh questions). In discussing features of Wh questions across languages, Weinreich (1963) has remarked on the gaps in the system of special interrogative words for different parts of speech. Verb interrogatives are rare. A few instances of direct adjective interrogation are contrasted with the roundabout English phrasing, "what kind of..." It is not clear whether any language has prepositional interrogatives, but Weinreich (1963) has suggested that they and the other "missing" types are possible.

That possibility is denied by Katz and Postal (1964) who have stated that 1) in English there are no question forms of prepositions, tense elements, modals, conjunctions; and 2) their theory appears valid for other languages (specifically disagreeing with Weinreich). In Katz and Postal's system (1964), only a Noun Phrase and possibly the Determiner constituent of a Noun Phrase can be questioned. The many apparent contradictions to this generalization have been resolved by analyzing the adverbial and Verb Phrase interrogatives as questioning an underlying Noun Phrase. A summary of the Katz and Postal (1964) meanings for Wh words is given in Table 1.

Leech's semantic analysis (1970) of some question "adverbials" (Wh words) tends to agree with that of Katz and Postal (1964). "Who" is interpreted as having the semantic component "human." "Where" asks for the relation of an object to location--"at/on/in what place." A paraphrase of "when" is "at the time at which." The acceptable forms to ascertain frequency of an event are "how often" and "how

many times," while a duration question is marked by "how long."

For an investigation of maternal and child responses to Wh questions, Robinson and Rackstraw (1972) generated a set of referential categories about which information can be sought and which certain Wh words normally represent. The ten major categories have been listed and subcategorized in Table 2.

In devising a logical treatment of questions, Katz (1968) presented definitions of such semantic relations as the presupposition, possible answer, evasion, and rejection of a question. The definitions relevant here would be that of presupposition, possible answer, and answer to a Wh question or "x-interrogative."

The presupposition is the statement which must be true if the question is to express a genuine request for information. A cogent example is the presupposition of "When did you stop beating your wife?".

A possible answer for a question has the same underlying phrase-marker as that of the presupposition except that each Noun Phrase in the presupposition which corresponds to a Wh + Noun Phrase in the question is replaced in the possible answer by a Noun Phrase with more semantic markers ("You stopped beating your wife at sometime" versus "You stopped beating your wife yesterday").

Lastly, a sentence is an answer to a question when the sentence is a possible answer and it is true.

Leech's description (1970) is in general accord with the above. A general well-formedness condition of question and answer sequences appears to be that the answer repeats the information of the

Table 1

Meanings of Wh Words in Underlying

Phrase-Markers of Questions

Wh Word	Meaning in the Underlying Phrase-Marker			
	Article			Pro-form
What	Wh[1]	+ a/some	+	one/thing/it
Who	Wh	+ a/some	+	one/body
Where	Wh	+ a/some	+	place
When	Wh	+ a/some	+	time
How	Wh	+ a/some	+	way/how
Why	Wh	+ a/some	+	reason
Which	Wh	+ the	+	one/thing/it
Whose	Wh	+ a/some	+	one/body's

[1]Wh is the scope indicator of a question. Attachment of it to a Noun Phrase indicates that the Noun Phrase is questioned.

Adapted from Katz and Postal, 1964, p. 92.

Table 2

Referential Categories Pertaining to Wh Questions

Category	Subcategories	Normal Interrogative
Identification	Personal object	Who
	Impersonal object	What
	Action	What (+ doing, happening)
Definition		What (+ is, are)
Description (non-state)		What like, about
Placing	Time	When
	Space	Where
Explanation	Categorization	Why
	Effect	Why
	Cause	Why, How
Process		How
Degree		How
State		How
Kind		Which (+ noun)
Manner		How

Adapted from Robinson and Rackstraw, 1972, p. 20.

question, giving additional information to replace the occurrence of the question formator. A requirement is that a question beginning with a Wh word should be followed by a statement in which the cluster containing the question feature is replaced by a cluster containing new content. Other than this substitution, the two specific sentences should be identical.

Robinson and Rackstraw's (1972) major emphasis has been on requirements for answers to specific Wh word questions. The general contextual requisites of an answer are that it convey a statement, not consist of a refusal to answer, and function within the same referential category as the question. Table 3 displays the semantic (-syntactic) requirements for answers to questions headed by the various Wh words.

Pragmatics of Wh questions. According to Morris (1938), understanding a language involves not only use of grammatical and semantical rules of a given group, but also possession of the expectations which others have when certain sign vehicles are employed, and the ability to express one's own states in ways which others use and understand. The pragmatic aspect of language involves this habit of the interpreter to use a sign vehicle under certain circumstances, and to expect such and such to be the case when a sign is used.

Watzlawick, Beavin and Jackson (1967) have viewed every communication as having content (report) and relationship (command) aspects. That is, each communication conveys information and reference as to how the message should be received (a defining of the communicants' relationship).

Table 3

Possible Answers to Various Wh Word Questions

Interrogative Word	Possible Answers
What	Object, activity
What noun	Specification of smaller set from the larger set mentioned
What...like	State, manner
Who	Unique person Role (i.e. "milkman")
When	Specification in terms of B.C./A.D.; or month, day, year Specification in terms of time from present Specification in terms of personal age Specification in terms of another event
Where	Map references and commonly known places Place relative to present location Place relative to mutually shared knowledge of a private sort (i.e., "five blocks from my house")
How	State or adjectival description with intensive complement (i.e., "It is ten miles long.") Manner description through adverbial group (i.e., "I ski very well.") Description of process: clauses; or "by," "with" + summary of activity Explanation of activity

Table 3 (continued)

Possible Answers to Various Wh Word Questions

Interrogative Word	Possible Answers
Why	Denial of oddity Restatement of questions (i.e., "because..") Appeal to regularity Appeal to essence Appeal to authority Appeal to emotions and wishes Explanation by analogy Categorization (i.e., "It's a case of guilt.") Cause-effect explanations
Which	Unique identification of the preferred member of set

Adapted from Robinson and Rackstraw, 1972.

In developing Morris' (1938) definition of pragmatics as the relation of syntax and semantics to behavior-in-response-to-signs, Lounsbury (1956) has defined situational and behavioral meanings of a linguistic form. Situational meanings involve language as responses to antecedent stimuli, while behavioral meanings point to language as stimuli for further responses.

While it would appear that questioning could be discussed within any of the above frameworks, the only function of language to be treated thoroughly in pragmatics has been the expression of true statements (Morris, 1938; Reichenbach, 1947), or ideational use (Jakobson, 1960). Descriptions of other uses of language have been scattered and sketchy, but have tended toward some common points.

Malinowski (1923) depicted language, for the primitive culture, as a mode of action rather than an instrument and/or communicator of thought. The essential "primitive" uses of speech are speech accompanying action, ritual handling of words, narration, and phatic communication (speech to establish ties of union).

For Morris (1938), linguistic signs can be employed to control the behavior of one's self, or of other users of the signs by the production of certain interpretants, namely habitual ways of responding. Commands, questions, entreaties, and exhortations are this sort of use.

Similarly, Reichenbach (1947) defined the purpose of instrumental usage of language as influencing the listener/reader for certain purposes intended by the speaker/writer. Forms of instrumental usage depend on the initiator's goal: 1) to inform

the recipient (communicative usage); 2) to arouse certain emotions in recipient (suggestive usage); 3) to induce performance of certain actions by recipient (promotive usage). Questions would appear to serve this last goal.

For Jakobson (1960), a focus on one of the six constitutive factors of the speech event (context, addresser, addressee, contact, code, message) produced one of the functions of language. He has described the six corresponding functions as the referential, emotive, conative, phatic, metalingual, and poetic. Jackobson also noted that he could not find verbal messages which fulfilled only one function. Rather, it seemed to him that different messages had differing hierarchies of functions. It would appear that the hierarchy for a question would include at least the conative (focus on the addressee) and referential (focus on the context) functions.

Several investigators have developed "applied" versions of the rather abstract function lists given above. In the descriptions formulated for experimental studies, the functions which questions may serve are clearer.

Soskin and John (1963) assumed that "talk" serves the purposes of achieving, maintaining, relieving, or avoiding certain psychological states. A primary distinction between the informational and relational functions of talk is made. The informational function is to deliver objective statements about one's self or about one's world. Relational talk consists of the range of verbal acts by which a speaker manages his interpersonal relations. When the speaker's intent is to effect an internal state change in the listener, the verbal

message structures the environment of the listener so that his response to his newly structured social environment results in the relation sought by the speaker. These relational messages can be 1) directive, in that the message specifies the behavior which will bring about the desired relation; or 2) inductive, in which the message provides information which will induce the listener to respond with the desired behavior.

Six types of verbal messages have been distinguished by Soskin and John (1963). The structone delivers informational statements, while the other five types--expressive, excogitative, signone, metrone, and regone--serve relational purposes. Regones are regulative statements which restrict, prescribe, or create opportunities for action in specific areas for the listener. Regones include forms such as demands, prohibitions, invitations, permissions, and requests. As a regone, a question is a relational message which is directive: the behavior which will bring about the desired relation is specified.

A list of the functions of initiations of dyadic interactions has been provided by Ervin-Tripp (1964). The six functions served are 1) requests for goods, services or information; 2) requests for social responses; 3) offers of information or interpretation; 4) expressive monologues; 5) routines (greetings); and 6) avoidance conversations (water cooler talk is less aversive than work). Questions would be included in category 1. However, verbal responses which are syntactically questions may serve the other functions. And a question whose major purpose is to request information may simul-

taneously meet other needs.

After reviewing available analyses of language functions (including those discussed above), Robinson (1972) presented and defined fourteen functions of language, identified the linguistic forms typically associated with each function, and gave a means of evaluating the effectiveness of a verbal response used for each purpose. Table 4 summarizes Robinson's (1972) presentation.

Category 13, Inquiry, is the behavior colloquially known as questioning. Its defined purpose is to acquire knowledge for the emitter. The interrogative sentence is its usual linguistic form. Its function has been fulfilled if the listener's response fills the appropriate gap in the speaker's knowledge.

However, as Robinson (1972) has indicated, interrogative sentences may meet the needs of categories 4, 7, 9, and 10. This multiplicity of uses has been clarified in Robinson and Rackstraw's (1972) listing of the functions of questions. Questions may be used to 1) reduce uncertainty about the matter explicitly referred to in the question; 2) obtain goods and services; 3) obtain or retain attention; 4) test authority; 5) register protest; 6) evoke embarrassment or other emotional states; 7) prevent an uncomfortable silence; or 8) strive merely for effect (rhetoric).

It may be useful at this point to present a summary (greatly oversimplified) of the known segments of the adult competence model for Wh questions. The adult may employ questions for various affective-social purposes (Ervin-Tripp, 1964; Robinson, 1972; Robinson and Rackstraw, 1972). However, the primary function for an adult question

Table 4

Functions of Language

1. Avoidance of worse activity
2. Conformity of norms
3. Aesthetics
4. Encounter regulation (greetings, etc.)
5. Performatives
6. Regulation of self (behavior, affect)
7. Regulation of others (behavior, affect)
8. Expression of affect
9. Marking of emitter (emotional state, personality, identity)
10. Role relationship marking
11. Reference to non-linguistic world
12. Instruction
13. Inquiry
14. Metalanguage functions

Adapted from Robinson, 1972, pp. 50-51.

seems to be epistemic --the filling in of a gap in a framework of knowledge (Robinson, 1972; Robinson and Rackstraw, 1972). A syntactic form is employed which requests information about missing Noun Phrases (Katz and Postal, 1964). These Noun Phrases concern person, object, location, time, reason, and manner.

Wh Questions From and To Children

Now to be considered are the pieces of evidence and suppositions about the meaning and functions of Wh questions for children. It should be stressed that the findings do not reflect developmental trends in growth of meaning or function. Those conclusions which have been derived from empirical work typically have dealt with one age group. Relationships among the earlier, observed, and later periods, if offered at all, have not been grounded in experimentation.

Meaning of child WH questions. During the second and third years of life, questions seek names of objects in the immediate environment (Cazden, 1970; Lewis, 1963; Piaget, 1951). "Where" questions indicate that the child's attention has been extended beyond the perceptually present (Lewis, 1963). At this point, "when" questions are sometimes answered as if they were "where" questions (Cazden, 1970; Clark, 1971). This occurrence has been cited as evidence that children acquire meaning component by component (Clark, 1971; Clark, 1973). That is, "when" has the semantic component "locative" plus other components. Apparently, the child first acquires that component of location.

It is the "why" question, though, which has stirred the interest of cognitive development researchers. Piaget, in particular, has

theorized about the functions of "why" questions in young children (1951). He has borrowed Stern's term to designate the years from three to seven or eight as "the second questioning age." The earliest "whys" are generally asked in connection with human actions, but they come to be used for every purpose, to demand reasons for everything. "Whys" occur at about the same time as 1) the formation of two distinct planes of reality (imagined versus real); 2) the earliest lies, and beliefs about the future; and 3) the appearance of the grammatical apparata (cases, tenses, subordinating prepositions) for the beginning of formulated reasoning. According to Piaget (1951), when "whys" first make their appearance, "a reorganization of values takes place in the child's mind, which enables us to see more clearly the relations uniting the different categories of questions" (p. 231).

Within Piaget's system (1951), the "why" questions of the child from three to seven or eight years have been categorized as "whys" of 1) (pre) casual explanation (in which the child is asking for final causes and/or psychological motivation for natural events); 2) psychological motivation (of human actions); and 3) justification (for customs and rules). Piaget has described the source of all three categories as "motivation," the search for an underlying intention for every act or event, even for chance happenings.

According to Piaget (1951), at roughly the age of three years the child recognizes the discord between reality and his desires. This discord is conceived by the child as an intentional resistance by people and things. The earliest "whys" seek the intention which the child assumes to reside in every act or event. From this search

for intentions arise two basic functions of thought: explicatory and implicatory. The explicatory function is rooted in the child's desire to explain events, the implicatory one is his tendency to justify every event and to search for connections between the presumed intention of one act and that of another deed.

Within the explicatory function, psychological intentionalism and physical causality are initially confused. Similarly, within the implicatory function, psychological and logical justification are originally undifferentiated. Gradually, the functions differentiate into 1) an explicatory function which seeks explanations of causality, reality, time, and place; 2) a mixed function which searches for motivation of actions and justification of rules; 3) an implicatory function which concerns names, classification, number, and logical relations.

Piaget has applied the above categorization not only to "why" questions, but to the earlier-appearing name and place questions (1951). Initially, according to Piaget, questions relate simply to names of objects and persons, and to the place which they occupy after they disappear. However, with growth of the explicatory function, place questions come to resemble those of reality and history--searches for circumstances, conditions, and consequences of events. The aim of name questions is modified by the development of the implicatory function. Names are subjected to logical justification through "childish etymologies."

Isaacs (1930), while in agreement with Piaget on the importance of "why" questions for cognitive growth, felt that Piaget's categori-

zation did not adequately discriminate among types of "why" questions. Isaacs' most encompassing classes are 1) affective and expressional (exclamations in question form); 2) epistemic (true causal inquiry which represents puzzlement produced by disparity between past experience and present event); 3) informational (demand for motives, purposes, functions); 4) justificatory (demand for the grounds for rules, statements, beliefs). Each of these types includes several finer subcategories.

The increasing cognitive complexity of Wh words implied by the above views has been the basis for ordering Wh words for scoring in a clinical procedure, the Developmental Sentence Scoring, or DSS, for estimating a child's syntactic development (Lee and Canter, 1971). Table 5 presents the DSS levels of Wh words. It should be noted that if a preliminary report (Koenigsknecht and Lee, 1971; as reported in Leonard, 1972) that the DSS ordering was accurate for productions of 200 children is confirmed (Lee, in press), then the DSS levels could become part of the developmental competence model.

Functions of questions for children. Before reviewing the sources on functions of questions for children, it should be reiterated that the literature is greatly lacking in offering empirical support.

Lewis (1963) has discussed the functions of questions posed to and by the child. The parent-child question-answer interchange is singled out as perhaps the most powerful means of promoting the child's reference to what is present, absent; past, future. In support, Lewis has cited question and answer games such as "Where's Da gone?" "School!" and "Where are you going?" "Bath!".

For Lewis (1963), the child's questions have elements of play, imitation (child asks in the manner that he has been questioned), and cooperation of others (mother plays along, and requires questions to be stated). Early questions serve to explore the present situation (naming) and absent things (location).

According to Halliday (1969), language is defined for the child by its uses. In that each utterance serves just one function, child language differs fundamentally from adult language (Halliday, 1973). Most adult utterances achieve several purposes at once (see discussion of adult pragmatics above). However, many adults are aware of only one function--the representational (expression of propositions). The child's internal model of language functions, according to Halliday (1969), is more complex, in that in addition to representational use, child language includes five other functions: instrumental (means of satisfying material needs), regulatory (control of behavior of others), interactional (interchange between self and others), personal (awareness of language as a way to express individuality), heuristic (investigation of reality), and imaginative (creation of private world). "Who" and "where" questions have appeared in an explanation of the interactional function (Halliday, 1973). However, the "proper" domain of questions is apparently the heuristic function. "Every child makes it quite obvious that this is what language is for [exploring reality] by his habit of constantly asking questions" (Halliday, 1969, p. 31). Halliday's functional approach to language development may be bolstered when results on his longitudinal study of the emergence of language functions from age nine to twenty-four

Table 5

Wh Question Levels of the Developmental Sentence Scoring

Level	
1	who, what, what + noun What do you want? Who is there? What book are you reading?
2	where, how many, how much, what...do, what...for Where is he? How many do you want? How much do you want? What are you doing? What is a hammer for?
3	when, how, how + adjective When shall I come? How do you do it? How big is it?
4	why, what if, how come, how about + gerund Why are you crying? What if I won't do it? How come he is crying? How about coming with me?
5	whose, which, which + noun Whose car is that? Which do you want? Which book do you want?

Taken from Lee and Canter, 1971.

months (in one child) have been published (referred to in Halliday, 1973).

Going beyond early development, Halliday (1969) has speculated that some children (those with a restricted language code) may not learn to operate with language in two functions crucial to school: the personal and the heuristic.

Learning and Questions

As explication of the above, one can consider Robinson and Rackstraw's (1972) four different ways that the question-answer interchange is basic to learning: 1) in motivating children to ask questions of their environment; 2) in equipping children with skills to pose their questions in answerable form; 3) in equipping children with skills to find answers to their questions; and 4) in enabling children to assess the validity of their answers.

Since the school is one of the agencies most responsible for a child's socialization, it would appear important to study what this agency makes available in the way of questions to the child for learning (Robinson and Rackstraw, 1972).

The classroom serves as a major linguistic environment for normal and retarded children. Studies conducted in regular classrooms over many years have consistently reported an extremely high frequency of teacher questions (Barr, 1929; Fahey, 1942; Jayne, 1945; Stevens, 1912; Susskind, 1969; Wrightstone, 1935). Research on the function of teacher questions has identified factual or recall questions as the most frequent type (Gall, 1970; Susskind, 1969;

Zimmerman and Bergan, 1971), while causal (underlying process) questions were infrequently used (Susskind, 1969).

Turnure and Thurlow (1972) have mentioned an "unstated feeling" in special education that teachers should de-emphasize questions other than those which require recall, since even factual questions may be difficult for children who lack verbal skills. There is some evidence that teachers of mentally retarded children do ask a greater percentage of factual questions (Fine, Allen and Medvene, 1968; Minskoff, 1967). Additionally, it was found that teacher questions to a special class were frequently unanswered until the teacher directed a student to respond (Stuck and Wyne, 1971).

There have been a few studies of the retarded child's linguistic environment which have gone beyond frequency counts. Such research has borne more on the situational stimuli for, and the quality of, adult questioning.

Siegel (1963b) has reported on a series of studies on the language behavior of adults (not teachers) and institutionalized retarded children and youth in interpersonal assemblies.

In a preliminary study, Spradlin and Rosenberg (1964) investigated junior college students' use of binary (Yes-No or disjunctive choice) and multiple (greater range of acceptable responses) questions in interviews with adolescent institutionalized retardates. The retardates were classified as having scored low or high on a language test. It was hypothesized that since it seemed likely that low retardates would respond more often to binary questions, adults would use more binary questions with them than with high verbal

retardates. Low verbal retardates did elicit more binary questions, but not at a significantly different level.

In a less structured situation ("play therapy"), two adults did not significantly differ in their questions to high versus low verbalizing retardates while encouraging the children to "express themselves" (Siegel, 1963a).

Siegel and Harkins (1963) compared the verbal responses of male college students to institutionalized high and low verbal retardates in two situations: 1) An unstructured five minutes when the adult was left alone with the child; 2) a structured five minutes when the adult was to instruct the child on the assembling of a form board. There were no significant differences in frequency of questions to low and high verbal retardates. Significantly fewer questions were asked in the structured condition.

Lastly, Siegel (1963c) studied the effect of instruction on the verbal behavior of adults in obtaining information from institutionalized retardates (again categorized by high and low verbal ability). Siegel hypothesized that the adult resorts to interrogation when required to obtain information without benefit of instructions. The adult barrages the child with questions, changes the subject often, and provides little opportunity for the child to respond (Siegel, 1963c). Half of the female college student subjects were in the "no instruction" condition. The others were instructed in "clinical" use of silence, verbal play, the reinforcement of the child's verbalizations to elicit information. All of the adult subjects then worked individually with both high and low verbal retarded

adolescent girls. "No instruction" adults used significantly more questions, and asked significantly more questions of low verbal retardates. Interestingly, response measures of the retardates in the two conditions did not differ significantly.

The above studies pioneered the study of characteristics of the retardate's communication events. However, left unaddressed were the topics of 1) the parameters of prolonged verbal exchanges between retardates and familiar adults (teachers), and 2) the linguistic complexity of the parties' utterances.

Hurley (1967 a,b) has conducted preliminary work in linguistic analysis of verbal interaction in special classes for the educable mentally retarded (EMR). He has suggested that the teacher may use a linguistic code which is structurally too complex for the children. A linguistic coding system was devised which could be used for both the teacher and children's utterances (Hurley, 1967a).

To date, its use with only two EMR classes has been reported (Hurley 1967a,b). The two teachers had an average of 3.5 years of teaching experience; the children had a mean chronological age (CA) of 9.75 years and a mean IQ of 63.

The coding system yielded a Sentence Complexity Score (SCS), a Length and Complexity Index (LCI), and a content analysis of the teachers and children's verbal productions. The SCS is computed from four part-scores. Points are given for a) Noun Phrase, b) Verb Phrase, c) additional words in the sentence, and d) type of sentence (simple, simple with phrase, elaborated simple, compound and complex, elaborated compound complex).

The LCI is obtained by summing a, b and c above. Hurley (1967a) claimed that LCI, mean length of response (MLR), and structural complexity are significant predictors of language development for children from ages 2; 6 to twelve years.

Hess and Shipman's (1965) system was utilized for the content analysis. Verbal communications were categorized by purpose: structuring, response requesting, reacting. Structuring utterances motivate, orient, or inform the child. Requests can require action or verbal reply from the listener. Reactions can be positively or negatively reinforcing of a previous statement, or neutral in tone.

From the results, Hurley (1967a) has concluded that the teachers reserved their more complex sentences for structuring. However, very often the children did not need to attend to, or understand these structuring sentences in order to answer questions. That is, while the teachers used relatively uncomplicated sentences throughout their teaching, their questions were even less complex. The frequency with which the teachers reworded their questions was also noted. Hurley's use of tapescripts did not allow determination of whether the restatements were due to absence of student response. However, Hurley (1967a) has reported a subjective impression of increasing simplicity in successive rewordings.

One deficit of the Hurley study is lack of information on the linguistic codes of teachers and children in regular classrooms. It would seem that experimental comparison of regular and special class linguistic environments is a necessity before describing the special class as a deficient linguistic environment (Hurley, 1967a,b). Such

a comparison would also be useful in formulating experimental hypotheses about which linguistic structures (including questions) are effective in furthering cognitive growth. A comparative study of the teacher linguistic environments in regular and special classes is now being conducted by the Research, Development and Demonstration Center in Education of Handicapped Children at the University of Minnesota.

Still remaining is the problem of lack of information about which linguistic structures, particularly which questions, are effective for children (Gall, 1970; Turnure and Thurlow, 1972). Gall's (1970) suggestions for efficacy research have included 1) limiting the task to identification of effective question types for a specific curriculum and classroom setting; 2) determining the utility of sequential questions.

A series of studies, in line with the first suggestion, have concentrated on the effectiveness of interrogative structures in facilitating paired-associate (PA) elaborational learning in grade school age EMR children (Thurlow and Turnure, 1972; Turnure, Buium and Thurlow, 1974; Turnure and Thurlow, 1972).

Thurlow and Turnure (1972) compared the effectiveness of declarative and interrogative sentence-forms in orally presented elaborations designed to enhance the PA learning of EMR children. Error analysis indicated that the EMR children did significantly worse with the interrogative sentence elaborations than with the declarative sentences. The study's design did not indicate whether this result was due to an actual difference in the EMR child's

processing of interrogative and declarative forms, or to experimental difficulties in constructing the interrogative elaborations.

A follow-up study with normal and EMR subjects (Turnure & Thurlow, 1972) investigated the effects of oral presentation of declarative and interrogative (Yes-No and Why) forms in the two elaboration structures of sentences and paragraphs (two sentences). Interrogative formulations were generally less effective for the EMR subjects, particularly when material presented in the question sentence was not expanded or clarified within an additional declarative sentence (sentence versus paragraph).

The variable of listening versus listening plus responding to an interrogative elaboration was manipulated by Buium and Turnure (1974). Listening did produce a higher recall score than such conditions as hearing a labeling of the pair members or attempting to generate a sentence about the members. However, the performance of the children in listening to interrogatives was poorer than that of subjects who listened and responded to interrogatives. Responding to "What" and "why" interrogatives produced much higher correct response means than responding to Yes-No questions.

The ranking of conditions (according to correct response scores) and production of superior recall by "What" and "Why" responding were replicated in a study including retarded and normal MA matched companion groups (Turnure, Buium & Thurlow, 1974). There were no significant differences in the population samples' correct recall scores in any of the six conditions of this study.

In the discussion of the reduced effectiveness of the oral presentation of interrogatives in facilitating EMR children's PA learning (Turnure and Thurlow, 1972), it was hypothesized that retarded children may persist in using a primitive form of the interrogative longer than normal children (for whom the mature interrogative form did operate effectively as an elaboration). It was suggested that prolonged naturalistic and systematic experimental work that focused on language development of EMR (and presumably also trainable mentally retarded) children was needed. Specifically, investigations could reveal the type of interrogatives and the sequence of their development in retarded children. The hypothesis that elaborations constructed of grammatical structures active in the child's own language are effective could then be tested.

The extent of semantic integration of the paired associates has been used to explain the comparatively greater efficacy of listerning and responding over simply listening to an interrogative (Buium and Turnure, 1974). This explanatory principle does not appear to negate the need for studies of question development in retarded children. If it is the necessity of formulating a verbal response to a "Why" or "What" question which induces the child to semantically integrate the paired associates, then this integration is dependent on the child's comprehending that 1) a question requiring an answer has been asked, and furthermore, 2) the particular kind of question asked requires a certain kind of response. It would appear that investigating the development of comprehension of questions and production of answers could delimit the usefulness of

certain interrogative elaborations.

Wh Questions in Early Language Development

The contribution of this paper to that investigation involves retarded children's comprehension of Wh questions when their production has just begun. Also entailed is comparison of the results with the early Wh question comprehension and production of normal children. In effect, this is a comparison of outputs. Before examining those outputs, a major source of input--the maternal linguistic environment--is considered.

Questions in the parental linguistic environment. Parental language to young children has been a neglected sector of current research in language development. Berko Gleason (1973) has presented some observational data on parental and child language in five families which each had a six-seven year old, a four-five year old, and a less than three year old child. Adult language to infants had features such as raised frequency of voice, simple short sentences with concrete nouns, endearments, and expansions of the child's utterances. With preschoolers, adults continued the use of endearments, but dropped the expansions. A "language of socialization" had developed. This type of language included syntactical questions which were actually imperatives, and sequences of questions which supply the entire context ("What did you do today?" "Did you paint?"). The child has only to answer yes or no. It was hypothesized that this kind of questioning teaches the child how to make a conversation and what kind of responses are expected of him in a conversation.

Horner and Gussow (1972) analyzed the verbal interactions of two lower class black three year olds and their mothers in the Skinnerian terms of tacts and mands (Skinner, 1957). Questions typically function as mands. For both mothers, mands most often served as requests for the child to move. The next highest percentage was held by mands for information. However, it was noted that while mands for information were usually in question form, their function appeared to be that of gaining and holding the child's attention.

Kobashigawa, as cited in Ervin-Tripp (1970), has described adult speech to children as "rich in questions." This high percentage of questions has been remarked as suggestive of prodding for feedback. Such prodding could aid children in discriminating questions from other utterances. It has been hypothesized that adult repetition increases when inappropriate or non-responses occur (Ervin-Tripp, 1970).

"What is that" or "What's that" were identified by Brown (1968) as the most frequent questions of the mothers of the three children in the Harvard longitudinal language development study. It was also reported that the occasional question form ("You want what?") was used much more frequently by the mothers of the two children whose grammatical understanding developed more rapidly. However, this finding was confounded by these two mothers' greater use of language to their children in general.

An experimental study of the maternal linguistic environments of twenty-four month old normal and Down's Syndrome children has been conducted (Buium and Rynders, 1973). Information was obtained

on systematic characteristics of the mother's language to her child in play and "teaching to set a table" situations. The maternal utterances were analyzed in terms of 21 linguistic parameters which included 1) grammatical features (DSS); 2) frequency of certain sentential structures; 3) vocabulary (Type Token Ratio or TTR); and 4) productivity (total words, total verbal response, total sentences, mean length of sentences, word rate per minute, mean length of verbal response, or MLR). It was reported that mothers produced many of the syntactical structures that other investigators (Bloom, 1970; Brown, 1968; Cazden, 1968; Klima and Bellugi, 1966; Miller and Ervin, 1964) have found to emerge earlier than others in the child's language. For the DSS parameters, most of the mothers' syntactical structures fell within the first two developmental levels.

There were differences in the frequency of occurrence of some linguistic parameters for the two groups. The Down's Syndrome children heard a higher number of sentences, yet a lower mean length of sentence; a higher number of verbal responses, yet a lower MLR. They were exposed to a higher frequency of grammatically incomplete sentences, imperative sentences, and single word responses. And, they listened to a lower frequency of indefinite pronouns, conjunctions, and Wh questions.

With regard to the Wh questions, it should be pointed out that although Down's Syndrome children heard fewer questions than normals in all situations, the relative distribution of those questions by Wh levels was the same in two of the three settings.

Whether or not an overall decrease in frequency coupled with the normal hierarchical distribution of Wh questions of mothers is related to deviant development of interrogative comprehension and production in Down's Syndrome children becomes an interesting question.

Child interrogative development. Deviant language development implies comparison with a standard of normality, so the findings on normal interrogative development are reviewed here. Research on normal children's Stage I (as defined by Brown, 1973: Mean Length of Utterance or MLU 1.01 to 2.01 morphemes) production of Wh questions is cited first. Then the fewer studies on Stage I children's comprehension of Wh questions are discussed. Finally, the available research on mentally retarded children's early language, particularly questions, is presented for comparison with the findings on normal development. It is reiterated that the review has been generally restricted to findings on the Stage I language child, that is, the child within the first period of multiword utterances. Such a constraint permits focusing on whether or not deviations appear in the early language of the mentally retarded.

In an early, cross-sectional study of 219 children's questions (Smith, 1933), age (CA 18 to 72 months) rather than MLU was used to categorize a child's status. Thus, locating Stage I children's results precisely has not been possible. However, if the general relation of increasing MLU and age is kept in mind, the recorded age trends have some value. In the children's texts, the percentage of sentences which were questions increased from 8% at two years to

19% at five years. Only 49% of the two-year-old subjects asked questions, but at age three years, 83% of the sample did. The percentages for the four and five year olds were 93 and 95%, respectively. Interrogative (Wh) words were used, overall, to introduce 36% of the questions. The age trend here was for a decrease in usage of Wh words: Wh words introduced 49% of the two-year-old subjects' questions, but only 37% of the subjects' five-year-old subjects' questions.

Validation of Lee and Canter's (1971) hypothesis of increasing semantic complexity Wh levels cannot be done with Smith's description of specific Wh word use by age (1933). Several different types (by Lee and Canter's system) of questions have been subsumed under the basic Wh word (specifically, "how" and "who"-"whose"-"which"). Table 6 presents Smith's (1933) data on age trends in use of particular Wh words. Beside each Wh word, in parentheses, is (are) the Lee and Canter (1971) level(s) at which questions with that word are found. Leaving aside the basically insoluble case of the "how" and "who" categories, it can be seen that the only obvious discrepancy is the earlier and greater frequency of occurrence of "why" than "when." Finally, it appears that the two and three year olds, the most likely candidates for Stage I language, devoted most of their questions to inquiries about place, action or name.

More recent studies of child language have used the longitudinal rather than cross-sectional method (Bloom, 1970; Bowerman, 1973a; Brown, 1973; Brown and Bellugi, 1964; Brown, Cazden and Bellugi, 1969; Miller and Ervin, 1964). The utterances of one child or a few children are systematically collected over a period of months

Table 6

Age Trends in Percentage of Questions Introduced by Wh Words

Wh Word	Percentage at age (in years)[1]			
	2	3	4	5
What (1, 2, 3)[2]	20	21	17	11
Where (2)	26	20	9	7
How (2, 3, 4)	1	1	4	9
Why (4)	1	1	3	6
Who-whose-which (1, 5)	1	3	3	2
When (3)	0	.2	.6	.8
What for (2)	0	1	1	2

[1]Percentages sum to percentage of all questions which were introduced by Wh words at that age.

[2]Number(s) in parentheses refer(s) to Lee and Canter (1971) Wh level(s) at which word is found.

Adapted from Smith, 1933.

or years. In the early studies (Brown and Bellugi, 1964; Brown et al. 1969; Miller and Ervin, 1964), analysis was done through the writing of transformational grammars to approximately what the child appeared to know about the syntactical rules of his language. However, later research (Bloom, 1970; Bowerman, 1973a) has concentrated on the semantic attributes, rather than syntactical structures, of the child's utterances. This approach has focused on semantic relational concepts such as "agent-action," which have been found in the child's language. It has been persuasively argued that there is a better fit of theory to data when the semantic attributes stance is taken (Bloom, 1970; Bowerman, 1973a; Schlesinger, 1971). However, since these arguments are not integral to this review, the interested reader is referred to the above studies.

Both syntactically and semantically oriented investigations have treated interrogative development. However, particularly for Stage I analyses, question production (both Yes-No and Wh) is acknowledged, described, exemplified, and then dropped. It certainly is not the most prominent feature of the period. According to Brown (1973), semantic relations dominate this stage, but the "germ" of the interrogative modality is present. "Information requests resembling Wh questions" is listed as a type of construction in late (MLU 1.68 to 2.06 morphemes) State I English.

The most extensive report on interrogative development has been Bellugi's description of interrogative syntactical structures (Bellugi, 1965; Klima and Bellugi, 1966). Grammars were written for the interrogative sentences of the three children (Adam, Eve,

Sarah) whose language development was followed by the Harvard research group. At the beginning of Bellugi's Stage 1, the children's MLU's ranged from 1.8 to 2.0 morphemes (thus within Brown's late Stage I). Their stage of language development was similar, but their CA's varied (18, 26, 27 months).

The children had means for expressing declarative, negative, imperative, and interrogative sentence functions. Their Wh questions were described as a few routines with little variation across the three children. The most common questions were some form of "What's that?" and "Where Noun Phrase (go?" (the parenthesis denoting an optional constituent), and "What Noun Phrase doing?" (Bellugi, 1965). In the later stages, the Wh word use is shown to change from this routine to a question introducer to a replacement for the missing constituent in the sentence (adult form). Also, the developmental appearance of certain transformational rules is depicted (Bellugi, 1965). However, these later stages are not presented here. Rather, attention is turned to other studies' evidence on Stage I interrogatives in English and other language learning children.

Language texts on five children (CA 1 year; 9 months to 2; 5 at the beginning of the study) were collected by Miller and Ervin (Ervin-Tripp, 1970; Miller and Ervin, 1964). Using the total different two-word combinations reported by Miller and Ervin (1964), Brown (1973) has suggested that two children of their project, Christy and Susan, could be ordered developmentally between some other studies' subjects who had MLY's of 1.19 and 1.32 morphemes. However, Brown (1973) offered no method for ascertaining actual or estimated

MLU's for the other three children of the Miller and Ervin project. "What" and "where" questions were used by all the children. For the youngest child studied, Susan, "what" questions were a late development in the period 1;9 to 2;0. During the period from 2;0 to 2;3, another subject, Christy, used "where" ten times with Noun Phrases and once with a verb. "What" occurred once with a member of a class of introducers ("this," "thisa," "that"). Christy also appeared to have a numberof memorized sentences, i.e., "Where are the shoe?" (Miller and Ervin, 1964). The probable grammatical rules for one child's "what" questions have been described by Miller (1973) as:

1) What-sentence what + ('s) + Noun Phrase
+ (Verb Phrase)

2) Verb Phrase Verb + (ing) + (Noun Phrase
or Preposition + Noun Phrase).

It was further stated that all five children had some such rules for both "what" and "where" questions, although the rules varied slightly for each child. For instance, 16 of Donnie's 250 sentences at 2;2 followed a rule which produced "what's that?" and "what's this?". His rule for "where" questions appeared to be:

Where ('s) (go) (a or the) (big) (Noun) Noun
(Ervin, 1964).

Little mention was made of interrogatives in Bloom's (1970) semantic relational analysis of three children's early utterances. However, Kathryn I's (MLU 1.32 morphemes) production "Where the spider" was classified as an unanalyzed "stereotyped" sentence.

The following studies of early interrogatives in languages

other than English are not strictly comparable to the English language ones. Most prominently, MLU's generally were not calculated by the researchers. Some of the studies were conducted before use of the MLU became common practice. Brown (1973) has discussed the difficulties recent investigations have encountered in computing MLU's for other languages. However, it would seem that the studies do pertain to Stage I. The questions have been depicted as the "earliest" and the contemporaneous non-interrogative utterances appear to fit Stage I descriptions. A second flaw in the summaries available to the author is the occasional lack of background information (child's age, family status, length of study) which has usually been included in the English language studies. However, the actual data bear great similarity to that from English-speaking children.

One month's utterances of a child (CA 28 months) raised in a Standard Mandarin Chinese environment have been analyzed (Chao, 1973). "What is this?" "Where is---?" and "Who is ---?" were listed as the most common questions, with "what" in attributive position ("what sort of...") given as a recent acquisition. "Where is---?" was described as being as much a command to look for something as a question about location.

Instances of early Wh questions from Finnish children have been cited by Bowerman (1973a). At MLU 1.81 morphemes, one subject had the "where" interrogative (wh-locative plus a Noun Phrase or Verb). Another child had the "Where Noun?" structure at MLU 1.83 morphemes. Within a few weeks, "What here?" or "What there?" was used by both children ("What is here?" was to Finnish mothers as "What's this?"

was to American mothers).

Remarking on the first stages of questioning for a French child, Gullaume (1973b) has stated that "What is that?" did not become a "mania" until age 22 months. For another child (CA 22 months, 7 days), "where" questions were first asked without the "where" (Guillaume, 1973a).

Lastly, information has been presented on the language development of a Garo (a Tibet-Burman language) and English-speaking child (Burling, 1973). At age 1;10 the phrase "Where's Paul?" was used. This phrase appeared to be memorized. By 2;9, pointing to an object and asking "wats dis" was established equally well in Garo and English.

In summary, it would seem that "unassimilated," "stereotyped," or routinized versions of a few Wh interrogatives are produced by normal children, learning various languages, in an early two-word utterance period. From inspection of the child's Yes-No questions (which lack the adult inversion of Noun Phrase and Verb) and the absence of structurally close variants of the child's Wh questions (for example, "What's that"--"What are those"), it has been inferred that the child does not comprehend the structure (syntactical rules) of adult Wh questions (Bellugi, 1965; Brown and Hanlon, 1970).

According to Brown and Hanlon (1970), a relation between parental frequency and order of emergence of forms in child language is exemplified by these Wh routines. It seems that any form produced with a very high frequency by the parents is somehow represented in the child's performance. Even if the form's structure is beyond

the child's grasp, he forms a version of the structure, and an idea of the circumstances in which it is used.

If early Wh constructions are "unassimilated fragments" (Brown and Hanlon, 1970), then the child's comprehension of adult Wh constructions should be of interest. If the child's Wh questions are strictly memorized routines, employed in rough approximation to appropriate situations, then the child's comprehension of Wh questions should be low, confined to types similar to his own. However, it may be, alternatively, that the child's comprehension rules have advanced beyond his production rules. The latter has been found true for older children with regard to other grammatical constructions (Fraser, Bellugi and Brown, 1963).

Unfortunately, research on children's comprehension of Wh questions has been rare. A major difficulty has been the devising of adequate indices of comprehension. With one exception (Ervin-Tripp, 1970), the information on comprehension has been extracted from mother-child question-answer sequences in the various longitudinal studies.

During Bellugi's Sta e 1 for interrogation (1965), Adam, Eve, and Sarah quite consistently responsed to "who" and "what" questions with some sort of Noun Phrase (Brown et al., 1969). However, while "What Noun Phrase doing?" questions were being produced, the children were generally not responding, or responding inappropriately to such questions (Bellugi, 1965; Klima and Bellugi, 1966).

"Who is---?" "Where is---?" and "What is---?" were given as questions asked and understood by the 28-month-old Chinese-speaking

child. The form "What's that?" was understood, but not produced (Chao, 1973).

The Finnish children studied by Bowerman (1973a) understood "what" questions before producing them (at the same time, "where" questions were being produced). However, after "what" questions were produced, "What Verb Phrase?" questions were not responded to, or were answered inappropriately (Bowerman, 1973b, has specifically connected this matter with the Harvard group's findings on "What ...doing?" questions for English-speaking children).

Guillaume (1973a) discussed only one instance of Wh question comprehension. By 16 months, 26 days, one child "clearly" understood "whose" questions. His replies gave someone's name.

Information on some American Stage I children's responses to a few Wh questions has been reported in Wetstone and Friedlander's (1973) experimental study of word order effect in questions and commands. There were no frequency differences in the "holophrastic" subjects' (mean MLU 1.75 morphemes) relevant responses to questions with normal, misplaced, and scrambled word orders ("Where is the truck?", "Where the is truck?", and "Truck the where is?" respectively). The Wh words employed were "where" and "whose." It was suggested that young children's comprehension is confined to recognition of familiar words and concrete relationships between those words which can be translated in terms of immediate reality. This hypothesis appears similar to Brown and Hanlon's explanation (1970) of the Stage I child's use of Wh routines (see discussion above).

Longitudinal text collection and experimental testing of Wh question comprehension have been reported by Ervin-Tripp (1970). From the initial texts for five children (see discussion of production data above for CA and MLU), the following comprehension data were noted: All five children had mastered the nominal, non-animate marker for "what," and the locative feature of "where." Four subjects had "animate" as a feature of responses to "who." It was also reported that four of the children controlled the possessive, animate Noun Phrase marking for "whose" by age 2;3.

Two cases of children's replies to specific Wh questions before productive use of those questions were examined. In each case, the structure of the reply was compared with that of a control utterance. Control sentences were selected by designating a lexical "center" of the answer, and locating in the text a contemporaneous free utterance, with that word, which was neither a reply, an imitation, nor part of a build-up sequence by the child.

Carol's (CA 2;6) utterances to "who" questions were shorter and simpler than those in free speech. Her answers included sentences more appropriate to "what," "where," and "what...do" questions. Her animate Noun Phrase replies were simpler than occurred in free speech, or in replies to "what...do" questions.

Laura (CA 2;7) appeared not to discriminate "what...do" questions from "where" questions; her answers to the former were locative.

A large group study involved monthly testing of 24 children who were from 2;6 to 3;1 at the beginning of the project. The

testing ended when the children were of ages 3;3 to 4;2. MLU's were not calculated for these children, and since longitudinal texts were not collected, one cannot use total number of utterances to place this group as Brown (1973) did with two of the small group children. However, since the children of the small group appear to have been included in the larger group, it would seem that some of the early replies would pertain to Stage I comprehension.

Each child was asked 30 Wh questions about scenes in a picture book. There were two forms of the test. Obviously, not all Wh question types were tested, nor was any Wh question type tested extensively. However, some trends are suggested by the obtained responses.

There were four "who" questions asked: two "who"-subject and two "who"-object. The group had the animate marker for "who" from the beginning. At 3;1, one-fourth of the group gave the object in response to a "who"-subject question. By 3;9, this error had disappeared. "Who"-object questions received appropriate answers (if answered at all) by 3;0. However, after 3;0, there was an upsurge in errors ("who"-subject responses) to a high point at 3;9. Several plausible explanations of this last finding have been offered by Ervin-Tripp (1970), but unequivocal support for any one was not found in the data.

The one "where...from" question elicited correct responses from many children at the beginning of testing. Another common response, though, was to ignore the "from."

Four "when" questions were asked. During the early months, two of the questions (which had to do with eating) were answered with nominals (food); the other two questions were locatives. This latter finding matches that of Clark (1971). The nominal and locative responses outnumbered temporal replies until 3;0. Then "causal" explanations (see "why" questions below) competed with the appropriate responses through 3;6. Temporal replies seemed to be of three kinds. There were apparently rote-learned, semantically irrelevant responses, i.e., "one o'clock" as a fixed reply. Other replies involved single advers ("soon") or clauses. Adverb-using children had previously given brief (one to three words) inappropriate responses. The clause-using subjects had averaged more than three words per non-temporal response. Additionally, the clause-using children began giving appropriate replies at a younger (median) age.

Response types to the four "how" questions could be described as sequential. At first, locative replies were common. Then nominals advanced until a peak at 3;1. The "causal" explanations (see "why" questions below) then competed with the appropriate responses. At 3;6 the two types were equal in frequency. Appropriate answers could take various grammatical forms in adult responses: full clauses, prepositional phrases, or gerund forms. The full clause was the earliest and most common form. A child's use of prepositional phrases was limited to utilizing the same phrase as a fixed reply to a question. Gerund forms were not present until late in testing.

Five "why" interrogatives were tested. Ervin-Tripp (1970) reported that, from the beginning, a majority of the children gave relevant answers, or used structural signals appropriate to such answers, i.e., "because." Nominals were common answers to two of the questions from the beginning to 3;2 (high point). However, these questions were apparently heard as "what...eating?" or "what... drinking?"

The results have been summarized by Ervin-Tripp (1970) in terms of 1) possible response strategies and 2) tentative order of acquisition.

The children's responses seemed to indicate reply strategies somewhat like the following: 1) If the question word is recognizable, give appropriate reply; otherwise, 2) if there is a transitive verb, respond with the object of the verb; 3) (given CA greater than 3;0) if there is an animate subject and intransitive verb, give causal explanation; 4) for remaining intransitive verbs, give a location or direction if it is missing.

The order of acquisition displayed in the data must be viewed as provisional. The small number of questions sampled plus considerable variation in individual order of acquisition make the overall results only tentative. With those cautions delivered, the order of acquisition found was "why," "who"-subject/"how," "where...from"/ "when," "who"-object (early to late).

One can inspect this ranking's agreement with the Lee and Canter (1971) Wh levels for produced questions. At least one type of "who" question was answered early. The late acqusition of

appropriate responding to "who"-object questions may be a case of formal linguistic (syntactic)--cognitive complexity interaction (Slobin, 1973). "How," "where...from" and "when" were ranked roughly as one would predict from the DSS levels (Lee and Canter, 1971). However, the early appropriate replies to "why" seem anomalous. They would appear to contradict not only Lee and Canter's suppositions on semantic complexity (1971), but also those of Piaget (1951) and Issac (1930).

Ervin-Tripp's finding on "why" responses calls to attention the distinction between discourse agreement and comprehension. Perhaps as a result of high frequency in parental speech, "because" is adopted by the child, along with a notion of the circumstances for use. Lewis (1963) commented that "because" probably does not indicate understanding of causality, but rather the child's awareness of juxtaposition of events.

Piecemeal as the above is, it is the available information for a model of the normal child's earliest production and comprehension of Wh questions. The matter for consideration is its comparability with retarded children's early production and understanding. Here one meets not fragmentation, but almost non existence of evidence (Miller and Yoder, 1973). Most studies of retardates' language development were conducted with an earlier model of language development which ignored the coherence and uniqueness of the child's language, and viewed it in terms of deviations from adult rules. Research with retarded subjects generally traced trends toward adult categories, or focused on the errors which

distinguished retardates from same-CA or mental age (MA) normal controls (for reviews of this kind of research, see Harrison, 1958; Jordan, 1967; McCarthy, 1964; Piens, 1962; Smith, 1962; Spradlin, 1963; Spreen, 1965).

To date, the approach embodied in recent studies of normal language has been incorporated into few studies of retarded development though there have been several calls for greater use (Carroll, 1967; Miller and Yoder, 1973). This paper will consider first those studies that have dealt with the similarity of language processes in normal and retarded children. The available data on retardates' early questions will then be detailed.

Lenneberg, Nichols and Rosenberger (1964) conducted an early, oft-cited, long-term study of language development in Down's Syndrome children and youth. The 61 subjects (CA 3-22 years), all raised at home, were studied over three years. Besides biomedical and psychological testing, articulation, sentence-repetition, and vocabulary tests were administered. Tapes of spontaneous utterances in play situations were made. Although grammars were not written, it did appear that the subjects used language rules. Such a conclusion seemed warranted by the subjects' performance in the sentence-repetition test. Children's imitations appeared dependent on the transformational rules that they possessed. That is, a child who spontaneously produced only non-inverted questions ("What he can do?") would not parrot an inverted version. This finding is in accord with normal children's imitations (Ervin, 1964; Slobin and Welsh, 1973).

A study (Lovell and Dixon, 1967) using the Imitation-Comprehension-Production Test (ICP) of ten grammatical contrasts (Fraser, Bellugi and Brown, 1963) indicated that for both normal (CA 2 to 6 years) and educationally subnormal (CA 6, 7 years; mean IQ's of 61.1 and 66.5) children, the previously found relationship I C P held (Fraser et al., 1963). The rank difficulty of the grammatical contrasts remained constant across tasks, age levels, and across categories of children. The overall performance of the six-year-old retardates was close to that of the three-year-old normals. Results for the seven year old retardates were similar to those for the normal four-year-old subjects. The retarded subjects were hardly candidates for Stage I language, but again the findings suggest that retarded children do develop and use, albeit slowly, the same language rules as normal children.

Such an assumption provided a basis for Lackner's (1968) writing of grammars for five mentally retarded children. Four of the Ss were institutionalized (MA/CA: 2;3/6;5, 2;11/13;1, 3;3/7;10, 4;9/16;2); one lived at home (8;10/14;4). All of the retarded subjects apparently had organic impairments.

Unfortunately, Lackner's transformational grammars for retarded children are not comparable to those cited above for normal children. Lackner's grammars were written from one eight-week period which each child spent at a study center. The grammars were compared from one subject to the next. Use of this cross-sectional technique seems dubious with such a small sample (one per mental age). There are other methodological problems. The institutionalized subjects came to the

study center in pairs, and the spontaneous speech samples were obtained from their conversations in the morning, at nap and bedtime (versus mother- or experimenter-child interactions used in most normal development studies).

The subjects were given naming, sentence-repetition, and comprehension tasks. The imitation and comprehension items were novel sentences which used either 1) vocabulary and transformations in a subject's corpus, or 2) syntactically more complex structures than those revealed by the child's speech. The same naming, repetition and comprehension tasks were given to five normal children (with CA's 2;8 to 5;9). These controls came to the center with their mothers for a one-time, two-hour test session.

Lackner's phrase structure grammars included transformation rules and forms which the child did not produce, but comprehended (the grammars for normal children have typically been based on apparent production rules). This inclusion of comprehension data led Lackner (1968) to label his grammars as ones of competence rather than of performance. That is a highly questionable claim--comprehension tests also suffer interference from performance factors which obscure actual competence.

Thus, whatever Lackner's results indicate, they must be considered as less than conclusive. Lackner compared the average sentence length (not MLU) of these retarded subjects with McCarthy's (1954) norms on gifted children and found no striking differences for retardate with given MA and gifted child of same CA. The normal controls' comprehension of sentences generated from the retardates'

grammars followed approximately the expected trend. All the normals understood sentences from the MA 2;3 grammar. The MA 2;11 and 3;3 sentences were understood by normals of age 3;5 and above. Sentences generated from the MA 4;9 grammar were comprehended by normals of ages 4;1, 5;2, and 5;9. Only the 5;9-year-old control understood all the sentences generated from the MA 8;10 grammar.

Of the interrogative sentence types of interest here, it was reported that questions were asked by all the retardates (highest frequencies per 1000 sentences were for the two subjects with the lowest MA's). The mentally retarded subjects with the three lowest MA's used "stereotyped" Wh questions and did not understand the generalized Wh question transformation. Insufficient description of the "sterotyped" Wh questions and the previously mentioned methodological flaws preclude labeling the results as Stage I interrogatives.

Recently, a longitudinal study of three Down's Syndrome children's early one- and two-word utterances was conducted through the Research, Development and Demonstration Center in Education of Handicapped Children, University of Minnesota. Weekly tape recordings of natural mother-child play situations were collected from the time the subjects reached the one-word utterance stage (approximate CA 48 months). Eleven months of data were semantically evaluated; that is, analyzed for agreement with the semantic relational concepts found in normal children's Stage I language (Bowerman, 1973a; Brown, 1973; Schlesinger, 1971). All the children's utterances were accounted for by the semantic relational concepts that previously were found in normal children's early utterances. All the semantic relational concepts

found in normal children's language (Bowerman, 1973a; Brown, 1973; Schlesinger, 1971) occurred in the subjects' language. Compared to occurrence in normal children, there was a two year lag in appearance of these semantic relational concepts in the Down's Syndrome children.

As with normal children, not all semantic relations appeared in the subjects' language within the same time. Table 7 gives the order of appearance. Interrogatives were a late occurrence in the data. Two of the subjects produced Wh interrogatives during the study. Table 8 contains the subjects' Wh questions. These interrogative utterances appear very similar to the earliest Wh questions of normal children. The same Wh words (what, who, where) are present. The questions seem to be of the characteristic "unassimilated" or routinized type. In sum, the Down's Syndrome subjects' earliest production of Wh questions appears to parallel that of normal children. One issue presently being pursued (Hesse, Turnure & Buium, 1975) is the Down's Syndrome subjects' comprehension of Wh interrogatives.

Preliminary analysis of the Down's Syndrome subjects' comprehension of maternal and experimentally-posed Wh questions has revealed a close similarity to what is known of Stage I language (Brown, 1973) normal children's interrogative comprehension.

In brief, Stage I American Down's Syndrome, and American and Finnish normal children are able to produce appropriate verbal responses to Wh questions which require object, person, and location answers (Bellugi, 1965; Bowerman, 1973a; Ervin-Tripp, 1970). Generally, it has been found that Stage I children demonstrate much poorer, or lack of, comprehension of Wh questions which require

action, quantity, manner, purpose, or cause responses. Contemporaneously, these children have been found to produce "information request" routines which incorporate the most frequent maternal Wh types: What, Who, and Where (Bellugi, 1965; Bowerman, 1973a; Brown, 1968; Buium and Rynders, 1973; Buium et al., 1974; Ervin-Tripp, 1970; Miller and Ervin, 1964).

The present analysis of the Down's Syndrome subjects' early development of the interrogative subsystem of language would appear to support the contention of Buium et al. (1974) that generally these Down's Syndrome children symbolically represent their experiences through the same modes of representation available to normal children.

Buium et al. (1974) proceeded to suggest a language intervention program in which there would be pairing of 1) presentation of syntactic rules (gradually varying in complexity) with 2) appropriate situations which reflect the semantic relational concepts concurrently available to the child. It would appear that language intervention directed at the further development of interrogatives could be aided by some additional normative data. As suggested above, the collection of frequency data on various Wh level types in mothers of post-Stage I normal children might aid in constructing language intervention programs. Frequency counts of post-Stage I normal children's Wh questions might suggest some tentative goals for language enhancement projects.

Some educational implications can be drawn from the present analysis. If a teacher's purpose in asking a question is positive feedback for either himself or his Stage I language retarded student, then the "best" types of Wh questions would seem to be those from

Table 7

The Semantic Relational Concepts in Three Down's Syndrome Children's Early Utterances, Presented in the Order of Their Appearance

Two Word Utterance
agent - action
action - object
agent - object
possession
attributions
demonstratives
location - object
locatives
negations (rejection, denial)
interrogatives
recurrance
person affected
dative

Three Word Utterance
agent - action - object
agent - action - location
agent - location - action
action - modifier - object
agent - modifier - action

Taken from Buium, Rynders, and Turnure, 1974.

Table 8

Wh Questions Produced by Ss During Longitudinal Study

what zat?

whazat pig?

whatsa mom?

whasa?

what trash?

whas this?

mom whozat?

who ga wawa?

where gay-r? (J. R.--S's sibling)

where's the? (ball)

whaz zebra? (where's the zebra)

where buk? (book)

whaz za box?

where's the buk?

where's a buk?

where da pig?

where de (the) cow?

where G? (a letter cut-out)

where da G?

Level I of the DSS (Lee and Canter, 1971). The limited comprehension of certain interrogative forms identified above also seems important in assessing the suitability of structured language programs recommended for the Stage I child, which could be pretested experimentally. For example, it is predicted that a project based on listening and responding to interrogative elaborations which utilize higher than Level 1 types, i.e., the "What...do" and "Why" elaborations of Turnure et al. (1974), would not produce high recall in Stage I language retarded students. Such a prediction seems supported by the present findings that Stage I Down's Syndrome subjects could not produce the type of response required by higher Wh level questions, (Hesse, Turnure & Buium, 1975). Such response control seems prerequisite to the semantic integration hypothesized as the factor enhancing recall (Buium and Turnure, 1974).

However, when the goal of a teacher's questioning is stimulation of the retarded child's language development, the most likely pressure point would seem to be Level 2 questions. Bellugi (1965) reported improved comprehension of Level 2 types in her second stage of child interrogative development. Indeed, a useful research project would be the comparison of the Level 2 interrogative comprehension by initially Stage I retardates who have or have not been exposed to a planned, concentrated presentation of teacher-asked Level 2 questions.

Finally, the school would seem an appropriate base for a long-term study on the comparative effects on interrogative comprehension of systematic sequences of 1) Wh question--Yes-No question ("Why did

you do that? Did you do that because you were angry?"), versus 2) Wh question--occasional Wh question form--supplied answer ("Why did you do that? You did that why? You did that because you were angry.").

The virtually universal custom of questioning children as a form of general social discourse, or more formally and didactically during tuition, suggests that the pervasive and cumulative impact of such activities during the child's experiential history may well be a major developmental impetus to progressive changes in general and specific cognitive factors (cf. Flavell, 1970), and, in broad terms, increasing the child's "processing space" (cf. Pascual-Leone, 1970; Rohwer, 1974). Beyond these speculations regarding the implications of questioning activities for new theoretical analysis in psychology (see also Berlyne, 1970), the educational importance of questioning (as, for instance, in "discovery learning," Friedlander, 1965; Suchman, 1961; Taba, 1963; individualized instruction, Morreau & Turnure, 1973; and in everyday routines, Jackson, 1968) argues for intensified research efforts into the nature and effects of this pervasive and intriguing practice.

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